INSTYTUT TECHNIKI BUDOWLANEJ
PL 00-611 WARSZAWA
ul. Filtrowa 1
tel.: (+48 22) 825-04-71
(+48 22) 825-76-55
fax: (+48 22) 825-52-86
www.itb.pl

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

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European Technical Assessment

ETA-11/0140 of 27/06/2016

General Part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	DMX® type KK, KM, KP and LK
Product family to which the construction product belongs	Three-dimensional nailing plates
Manufacturer	DOMAX Sp. z o.o. Al. Parku Krajobrazowego 109 PL 84-207 Koleczkowo, Łężyce
Manufacturing plant	DOMAX Sp. z o.o. Al. Parku Krajobrazowego 109 PL 84-207 Koleczkowo, Łężyce
This European Technical Assessment contains	32 pages including 2 Annexes which form an integral part of this Assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	Guideline for European Technical Approval ETAG 015, Edition November 2012 “Three-dimensional nailing plates”, used as European Assessment Document (EAD)
This version replaces	ETA-11/0140 issued on 29/06/2011

This European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Specific Part

1 Technical description of the product

The three-dimensional nailing plates DMX® type KK, KM, KP and LK are one-piece, non-welded elements, made of galvanized steel sheet grade DX51D+Z275 according to EN 10346.

The three-dimensional nailing plates DMX® type KK, KM, KP and LK correspond to the drawings and descriptions given in Annex A. The characteristic material values, dimensions and tolerances of the three-dimensional nailing plates not indicated in these Annexes shall correspond to the respective values laid down in the technical documentation of this European Technical Assessment. The dimension tolerances shall meet the requirements of EN 22768-1.

2 Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

The DMX® three-dimensional nailing plates are intended to be used for connecting the mutually perpendicular, load-bearing, solid timber elements, in side-grain to side-grain configurations, in joints for which requirements for mechanical resistance and stability in the sense of the Basic Requirements for Construction Works 1 of Regulation (EU) No 305/2011 shall be fulfilled.

Ring shank nails Anchor (Gunnebo Ankarspik) with the diameter of 4 mm and the length not less than 50 mm (Annex A18) manufactured by the companies GUNNEBO INDUSTRIER AB, Gunnebo (Sweden) or GUNNEBO INDUSTRIER Sp. z o.o., Orneta (Poland), as well as BMF connector nails with the diameter of 4 mm according to ETA-04/0013 or other ring shank nails according to EN 14592 with the diameter of 4 mm and characteristic tensile capacity $F_{ax,Rk}$ not less than 1,55 kN shall be used for connections made with the DMX® three-dimensional nailing plates.

The DMX® three-dimensional nailing plates are made of the cold-formed steel sheet grade DX51D according to EN 10346, with the thickness of 2,0 mm (type KK, KM and LK) or 2,5 mm and 3,0 mm (type KP), with the zinc coating mass of 275 g/m^2.

In respect of the requirements concerning corrosion resistance, DMX® three-dimensional nailing plates are for use in timber structures subjected to the internal conditions defined by service classes 1 and 2 according to EN 1995-1-1 (Eurocode 5), in corrosion aggressiveness categories C1 and C2 according to EN ISO 12944-2, without action of gases or acid vapours.

The provisions made in this European Technical Assessment are based on an assumed working life of the three-dimensional nailing plates of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer or the Technical Assessment Body, but should only be regarded as means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Performance of the product

3.1.1 Mechanical resistance and stability (BWR 1)

3.1.1.1 Strength

The characteristic load-carrying capacities of joints loaded according to static diagrams No 1 and 2 shown in Annex B1, determined by tests carried out according to ETAG 015, clause 5.1.3, are given in Annex B. The characteristic load-carrying capacities of joints for other load directions shall be calculated on the basis of EN 1995-1-1 (Eurocode 5) or according to national regulations. The design values shall be determined according to EN 1995-1-1 (Eurocode 5).

3.1.1.2 Stiffness

No performance assessed.

3.1.1.3 Ductility in cyclic testing

No performance assessed.

3.1.2 Safety in case of fire (BWR 2)

3.1.2.1 Reaction to fire

The steel elements are classified as class A1 of reaction to fire (non-combustible products) in accordance with EN 13501-1 and to European Commission Decision 96/603/EC amended by European Commission Decision 2000/605/EC.

3.1.2.2 Resistance to fire

Performance in relation to fire resistance would be determined for the complete structural element with any associated finishes.

No performance assessed.

3.1.3 Hygiene, health and the environment (BWR 3)

Regarding the dangerous substances clauses contained in this European Technical Assessment, there may be requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.1.4. Sustainable use of natural resourses (BWR 7)

No performance assessed.

3.1.5. General aspects

The durability and serviceability of DMX® three-dimensional nailing plates have been assessed when used in conditions defined by service classes 1 and 2 according to EN 1995-1-1 (Eurocode 5). The installation instructions including special installation techniques and provisions for the qualification of the personnel are given in the manufacturer's technical documentation.

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

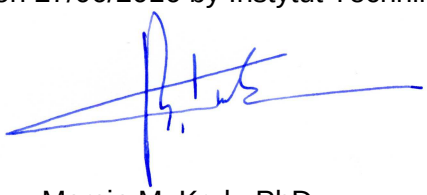
According to Decision 97/638/EC of the European Commission the system 2+ of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) applies.

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document (EAD)

Technical details necessary for the implementation of the AVCP system are laid down in the control plan which is deposited at Instytut Techniki Budowlanej.

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 27/06/2016 by Instytut Techniki Budowlanej



Marcin M. Kruk, PhD
Director of ITB

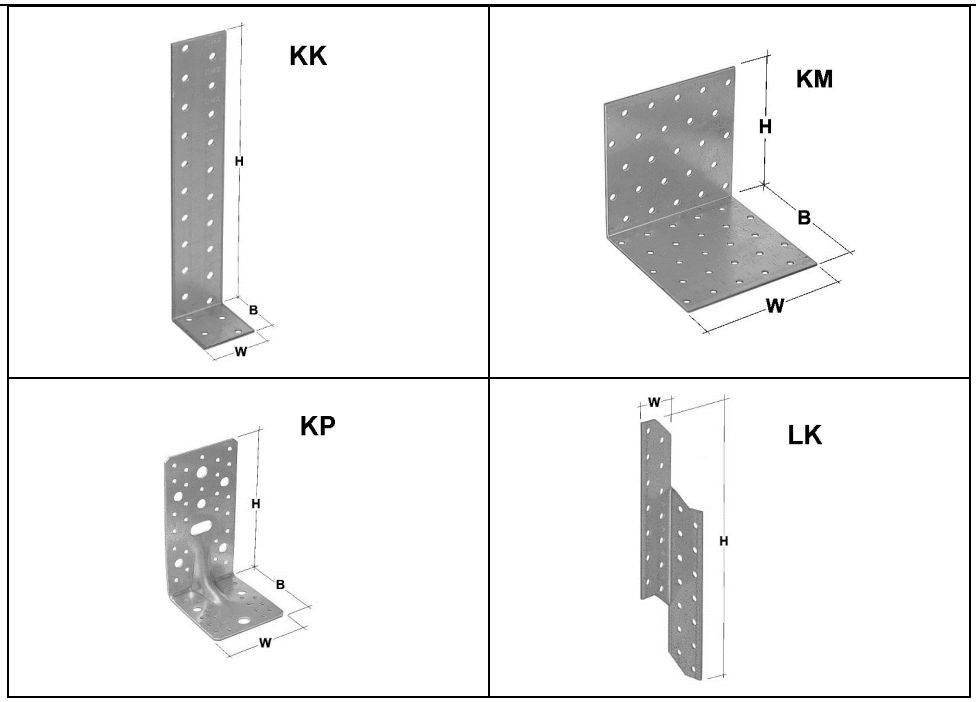


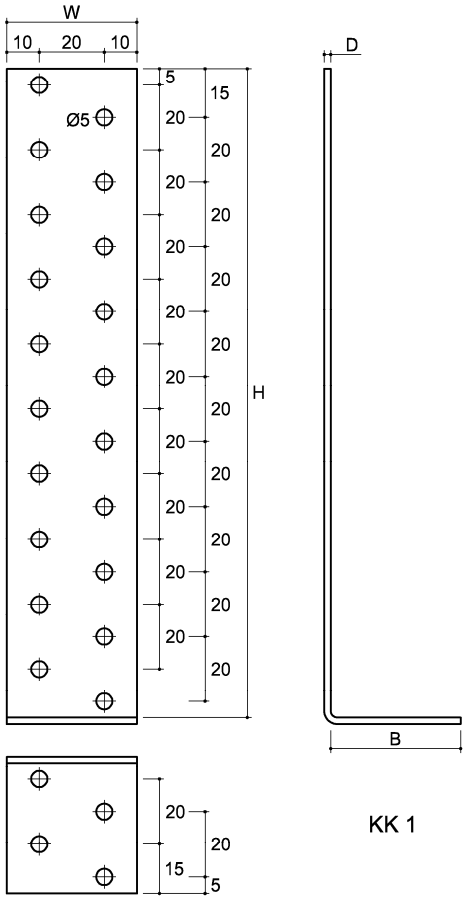
Table 1. DMX® three-dimensional nailing plate types and dimensions

DMX® type	DMX® symbol	Dimensions, mm					
		H		W		B	
		Min	Max	Min	Max	Min	Max
KK	KK 1 to KK 3	200	400	40	40	40	40
KM	KM 1 to KM 15	40	100	40	200	40	100
KP	KP 5 to KP 6	143	172	65	90	105	143
LK	LK 1 to LK 8	170	290	32	32	100	220

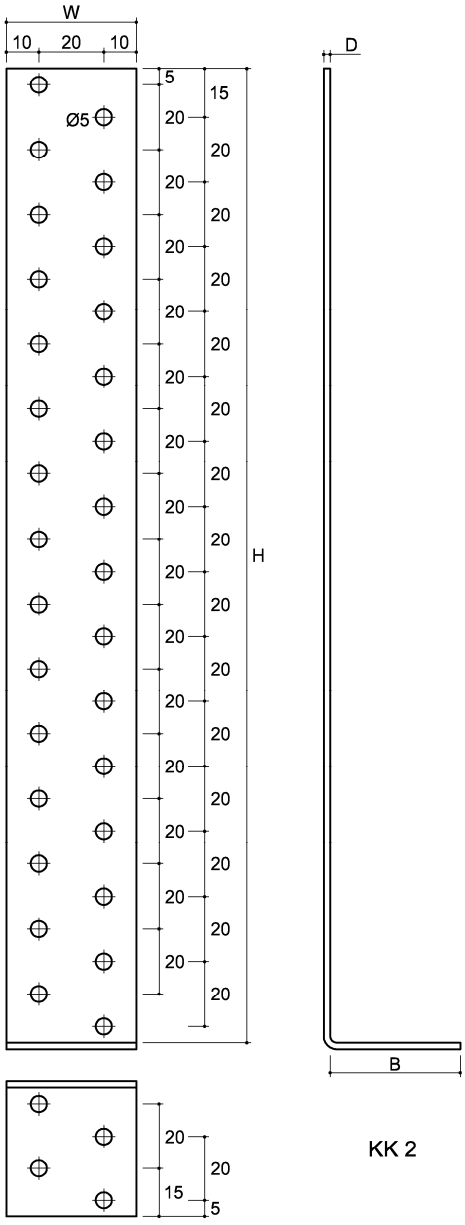
Table 2. Grade and steel sheet specification

DMX® type	DMX® symbol	Sheet thickness, mm	Sheet grade according to EN 10346	Zink coating mass, g/m²
KK	KK 1 to KK 3	2,0	DX 51D+Z275	275
KM	KM 1 to KM 15	2,0		
KP	KP 5	2,5		
	KP 6	3,0		
LK	LK 1 to LK 8	2,0		

DMX® type KK, KM, KP and LK	**Annex A1** of European Technical Assessment ETA-11/0140
Types and materials	



KK 1



KK 2

Table 3. DMX® type KK three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes
	W	H	B	D	ϕ5
KK 1	40	200	40	2	24
KK 2	40	300	40	2	34

DMX® type KK, KM, KP and LK	**Annex A2** of European Technical Assessment ETA-11/0140
Three-dimensional nailing plates DMX® KK	

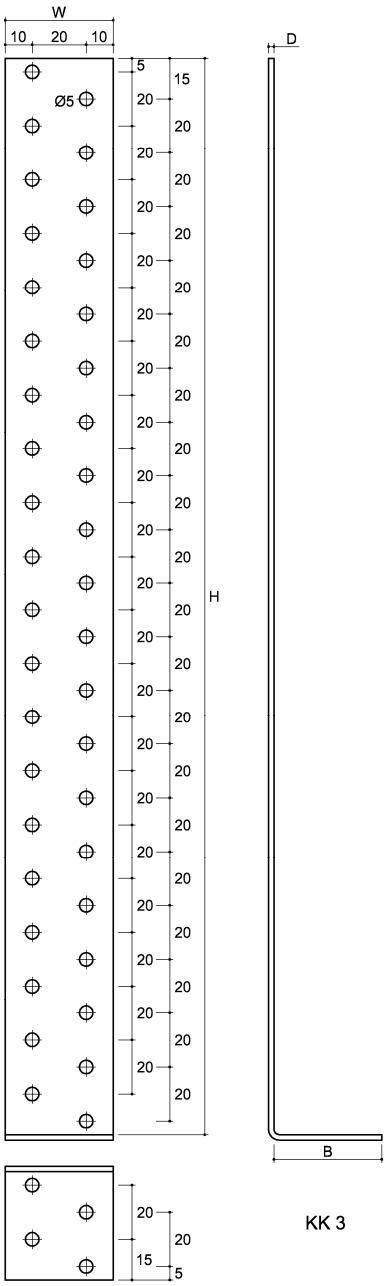


Table 4. DMX® type KK three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes
	W	H	B	D	ϕ5
KK 3	40	400	40	2	44

DMX® type KK, KM, KP and LK	**Annex A3** of European Technical Assessment ETA-11/0140
Three-dimensional nailing plates DMX® KK	

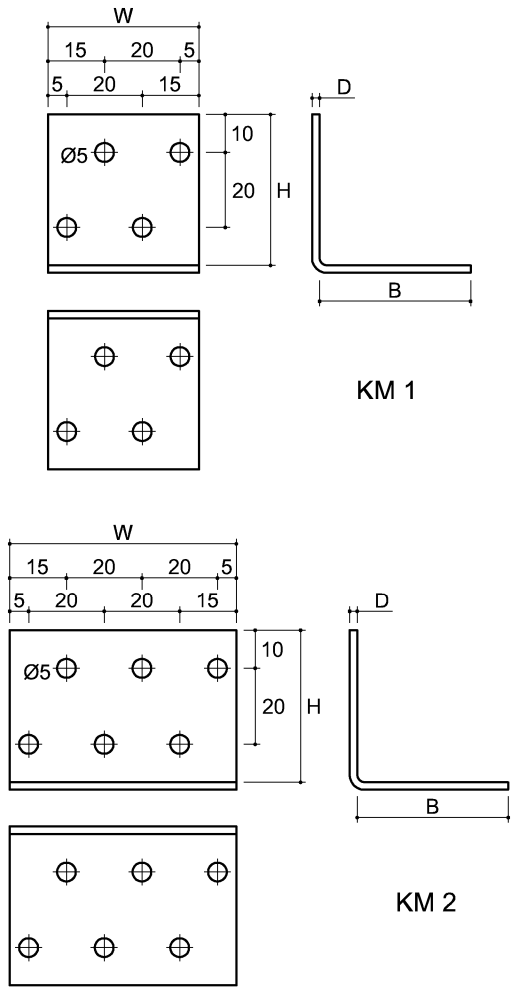
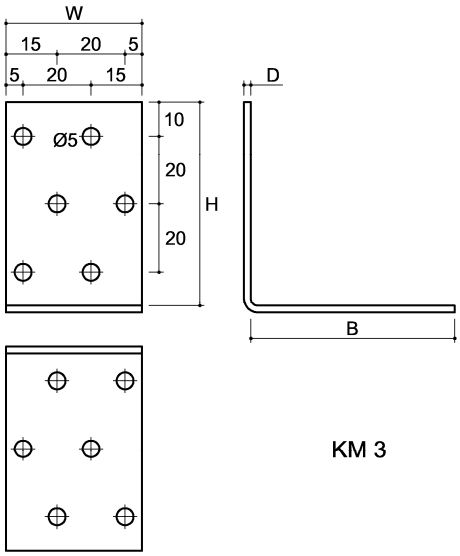


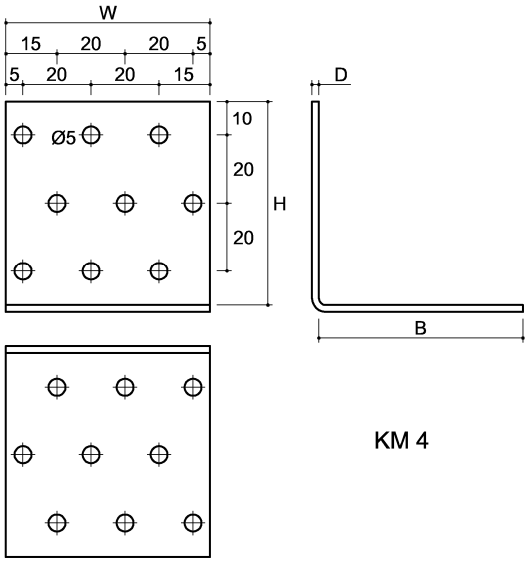
Table 5. DMX® type KM three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes
	W	H	B	D	ϕ5
KM 1	40	40	40	2	8
KM 2	60	40	40	2	12

DMX® type KK, KM, KP and LK	**Annex A4** of European Technical Assessment ETA-11/0140
Three-dimensional nailing plates DMX® KM	



KM 3

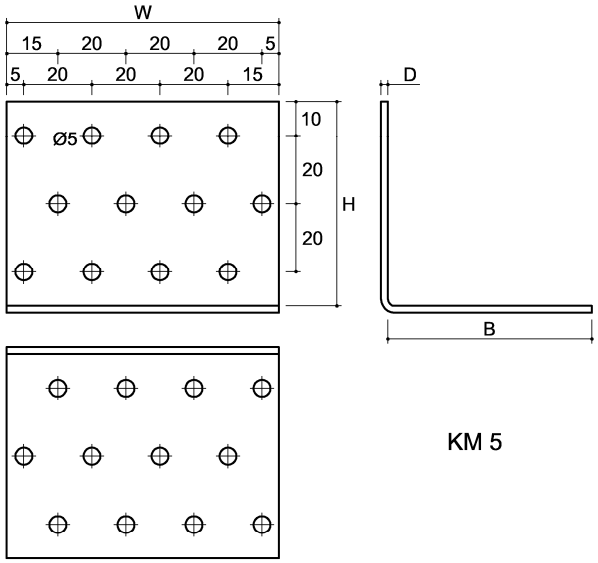


KM 4

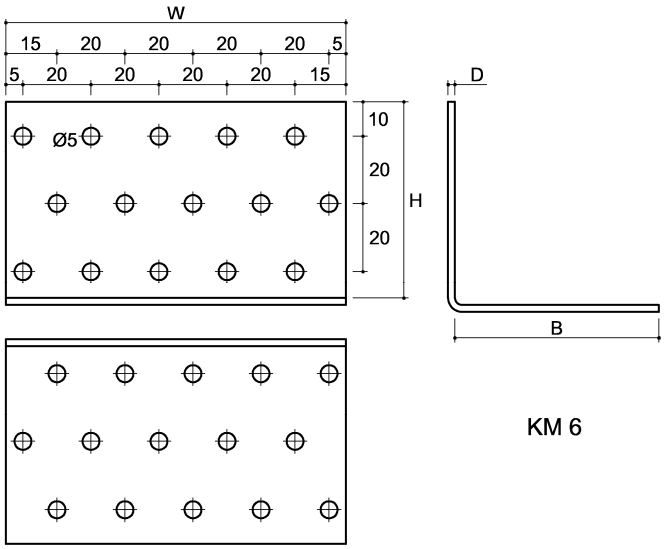
Table 6. DMX® type KM three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes
	W	H	B	D	ϕ5
KM 3	40	60	60	2	12
KM 4	60	60	60	2	18

DMX® type KK, KM, KP and LK	**Annex A5** of European Technical Assessment ETA-11/0140
Three-dimensional nailing plates DMX® KM	



KM 5

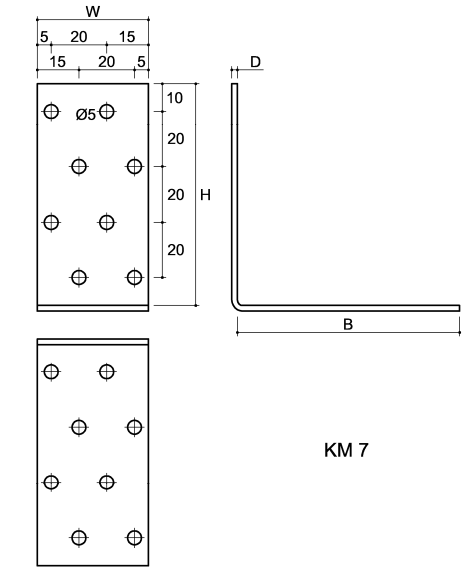


KM 6

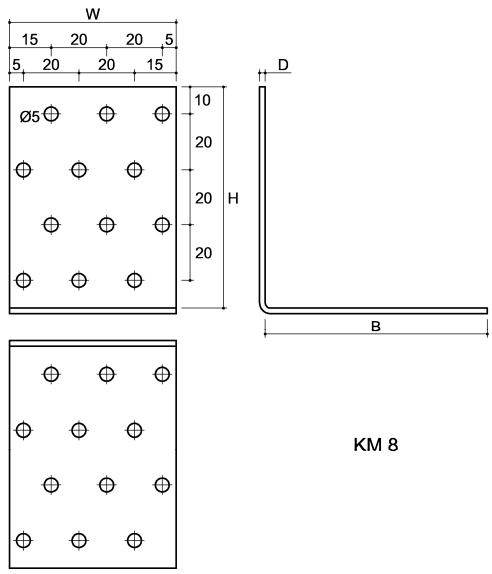
Table 7. DMX® type KM three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes
	W	H	B	D	ϕ5
KM 5	80	60	60	2	24
KM 6	100	60	60	2	30

DMX® type KK, KM, KP and LK	**Annex A6** of European Technical Assessment ETA-11/0140
Three-dimensional nailing plates DMX® KM	



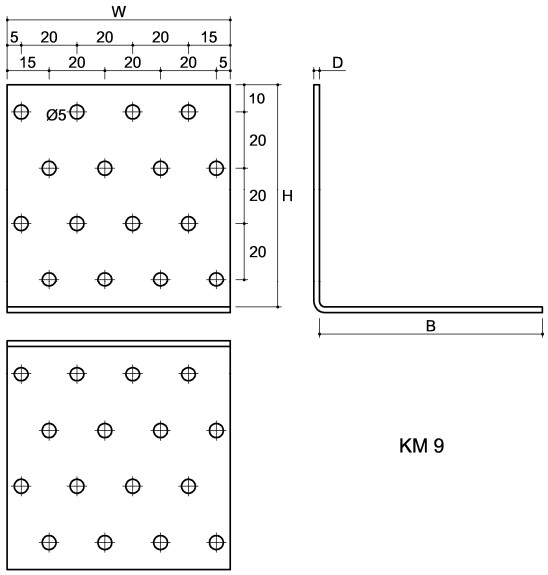
KM 7



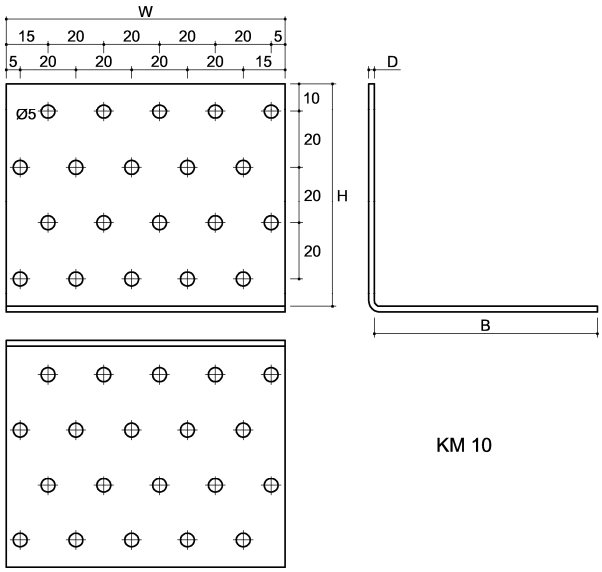
KM 8

Table 8. DMX® type KM three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes
	W	H	B	D	ϕ5
KM 7	40	80	80	2	16
KM 8	60	80	80	2	24



KM 9



KM 10

Table 9. DMX® type KM three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes
	W	H	B	D	ϕ5
KM 9	80	80	80	2	32
KM 10	100	80	80	2	40

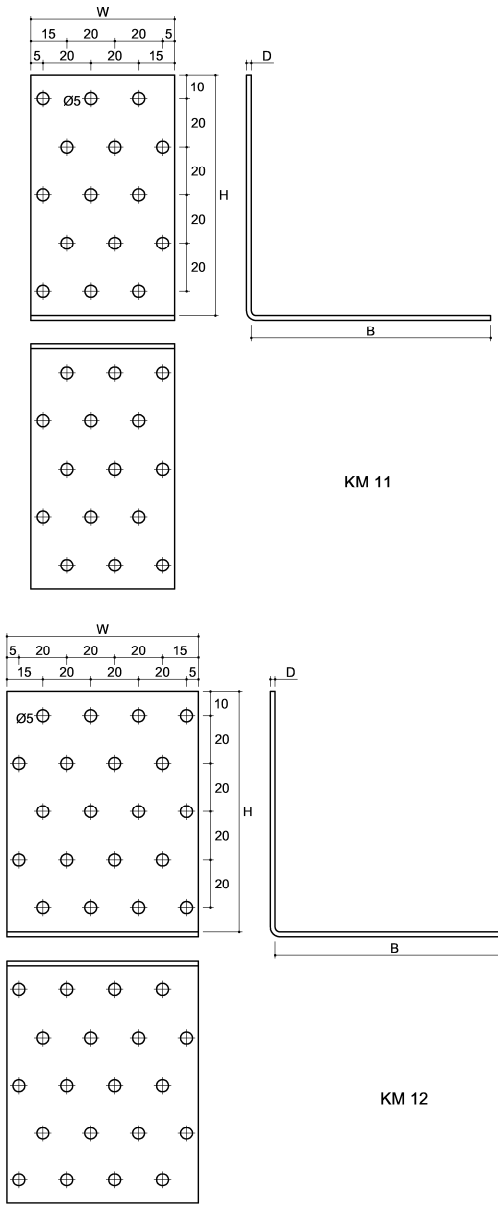
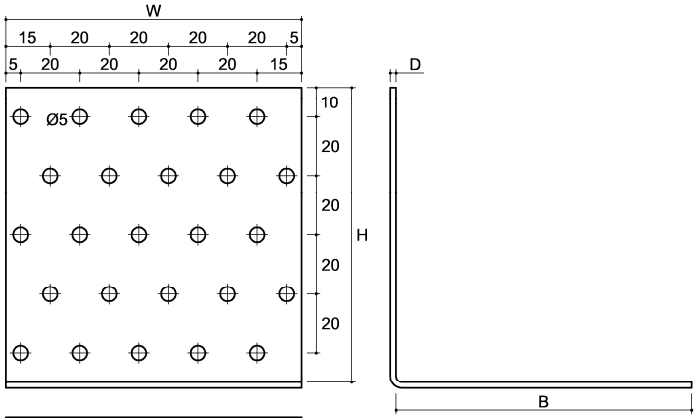
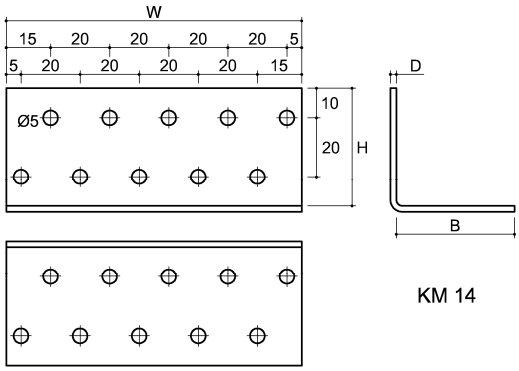


Table 10. DMX® type KM three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes
	W	H	B	D	ϕ5
KM 11	60	100	100	2	30
KM 12	80	100	100	2	40



KM 13



KM 14

Table 11. DMX® type KM three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes
	W	H	B	D	ϕ5
KM 13	100	100	100	2	50
KM 14	100	40	40	2	20

DMX® type KK, KM, KP and LK	**Annex A10** of European Technical Assessment ETA-11/0140
Three-dimensional nailing plates DMX® KM	

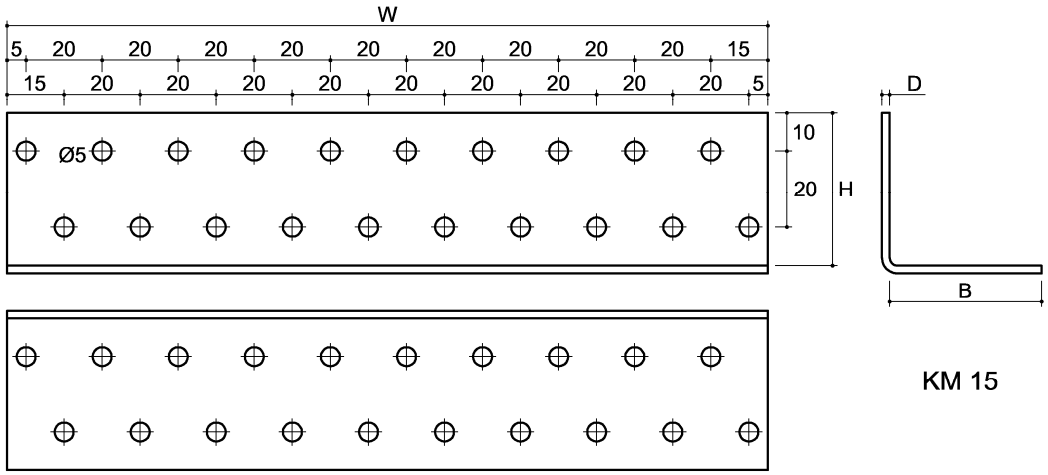
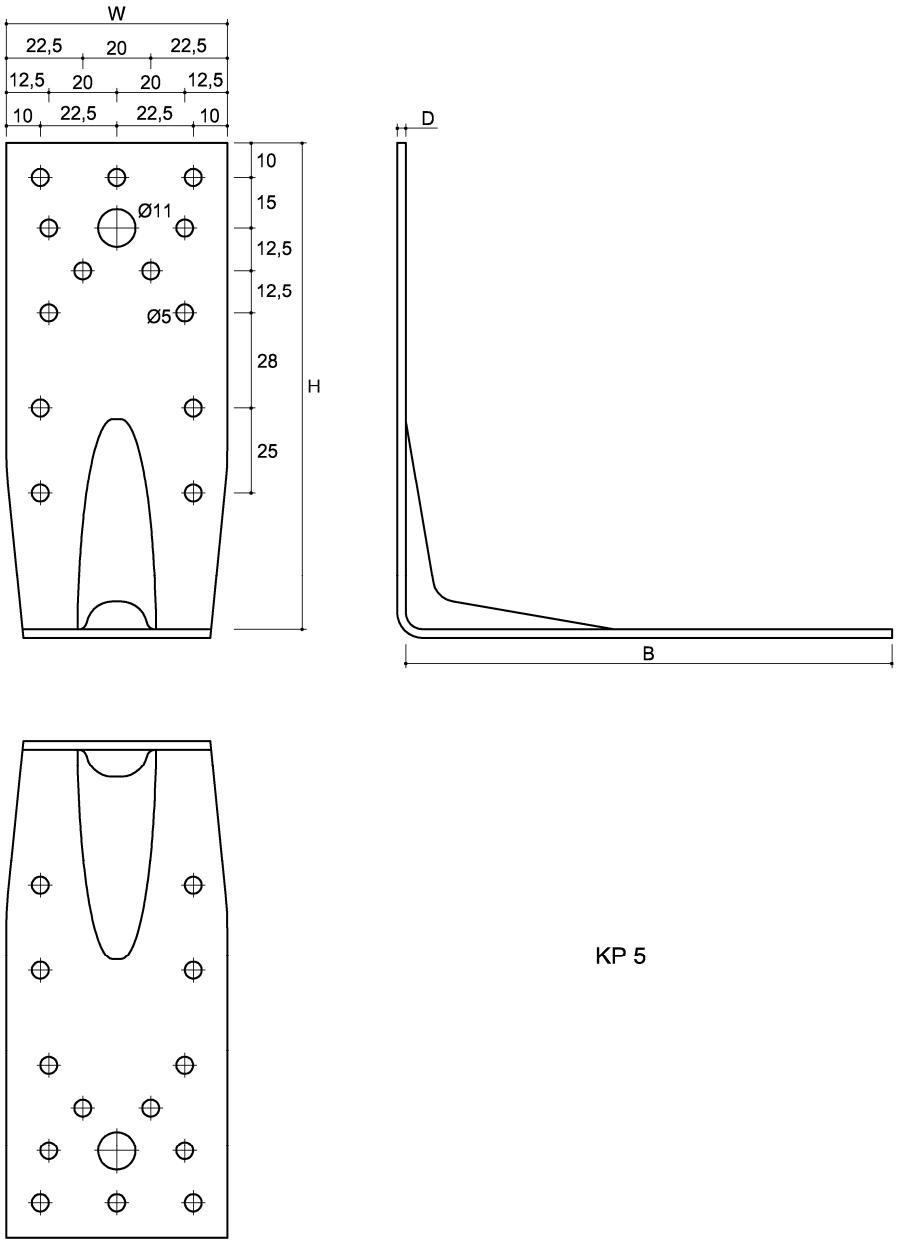


Table 12. DMX® type KM three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes
	W	H	B	D	ϕ5
KM 15	200	40	40	2	40



KP 5

Table 13. DMX® type KP three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes	
	W	H	B	D	ϕ5	ϕ11
KP 5	65	140	140	2,5	26	2

DMX® type KK, KM, KP and LK	**Annex A12** of European Technical Assessment ETA-11/0140
Three-dimensional nailing plates DMX® KP	

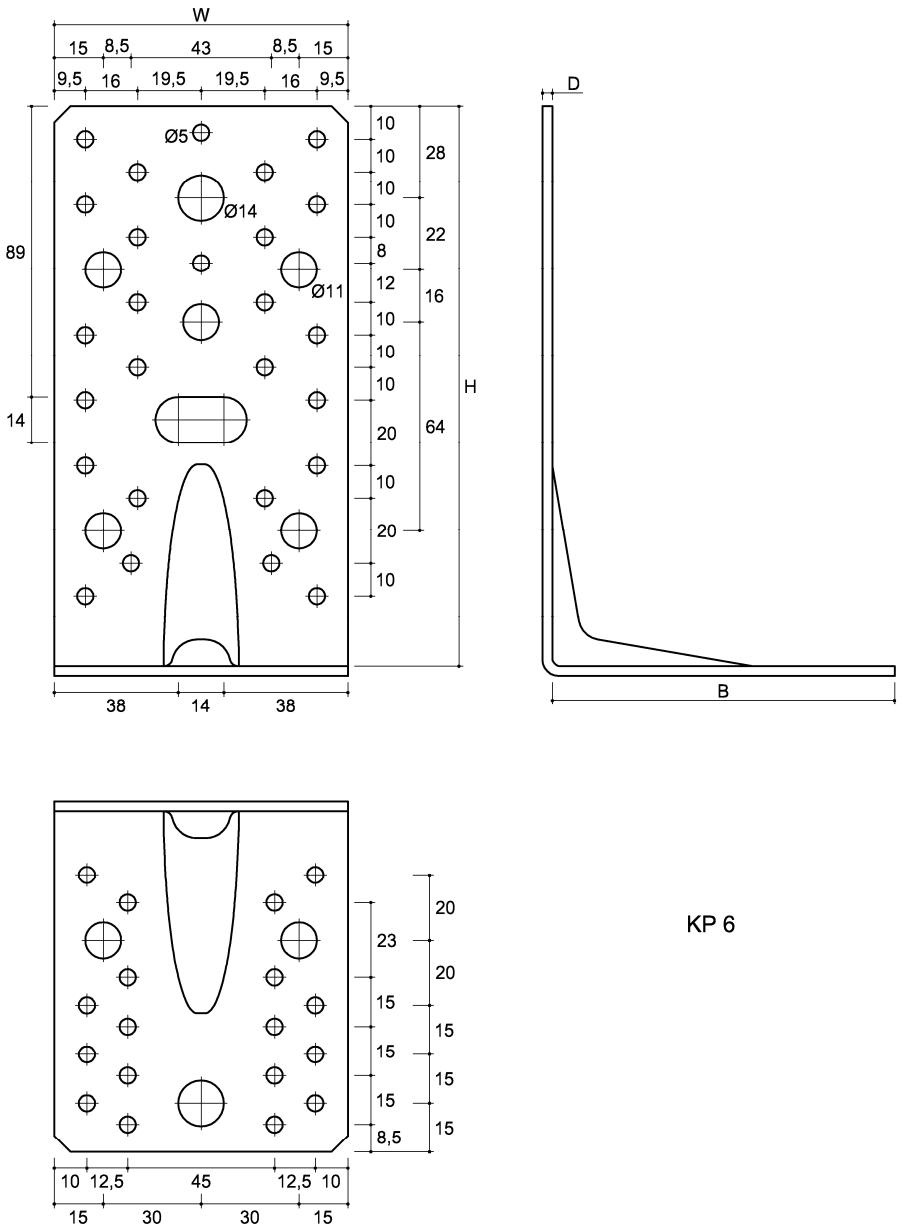


Table 14. DMX® type KP three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes		
	W	H	B	D	ϕ5	ϕ11	ϕ14
KP 6	90	172	105	3	44	7	2

DMX® type KK, KM, KP and LK	**Annex A13** of European Technical Assessment ETA-11/0140
Three-dimensional nailing plates DMX® KP	

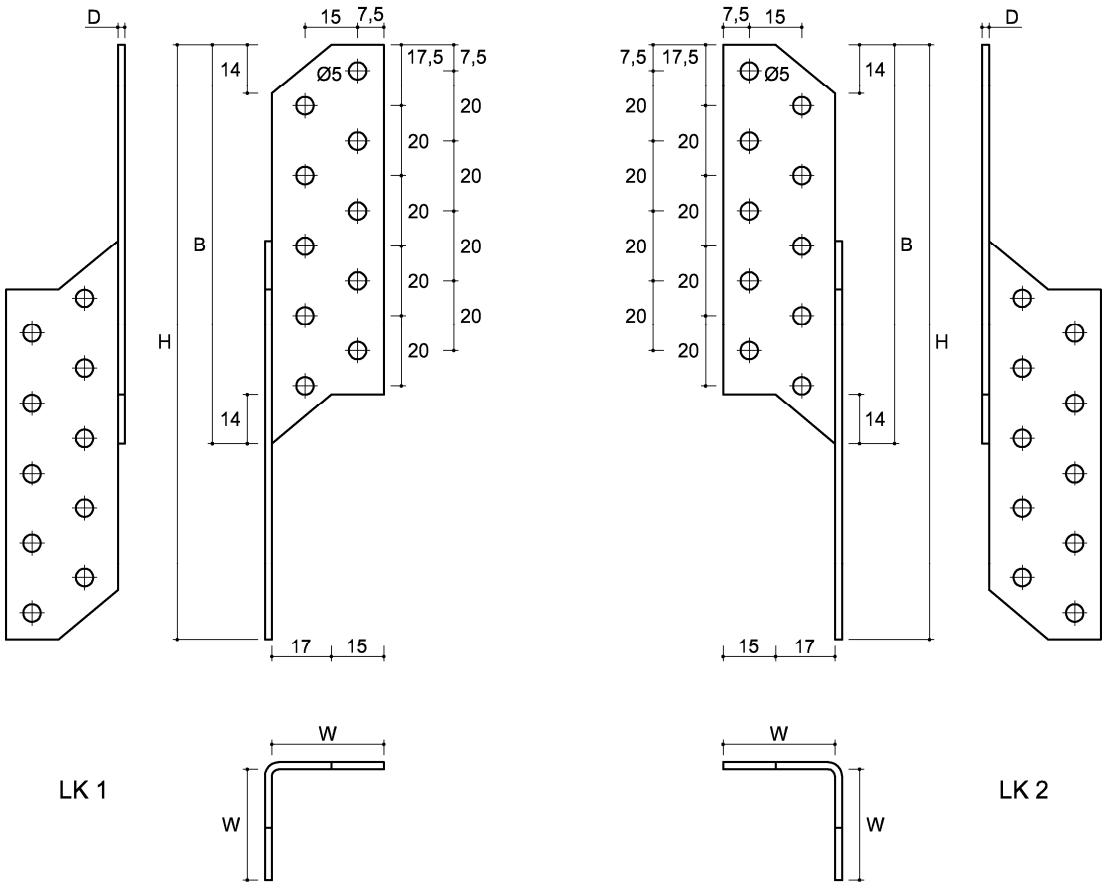


Table 15. DMX® type LK three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes	Type
	W	H	B	D	ϕ5	
LK 1	32	170	114	2	20	left
LK 2	32	170	114	2	20	right

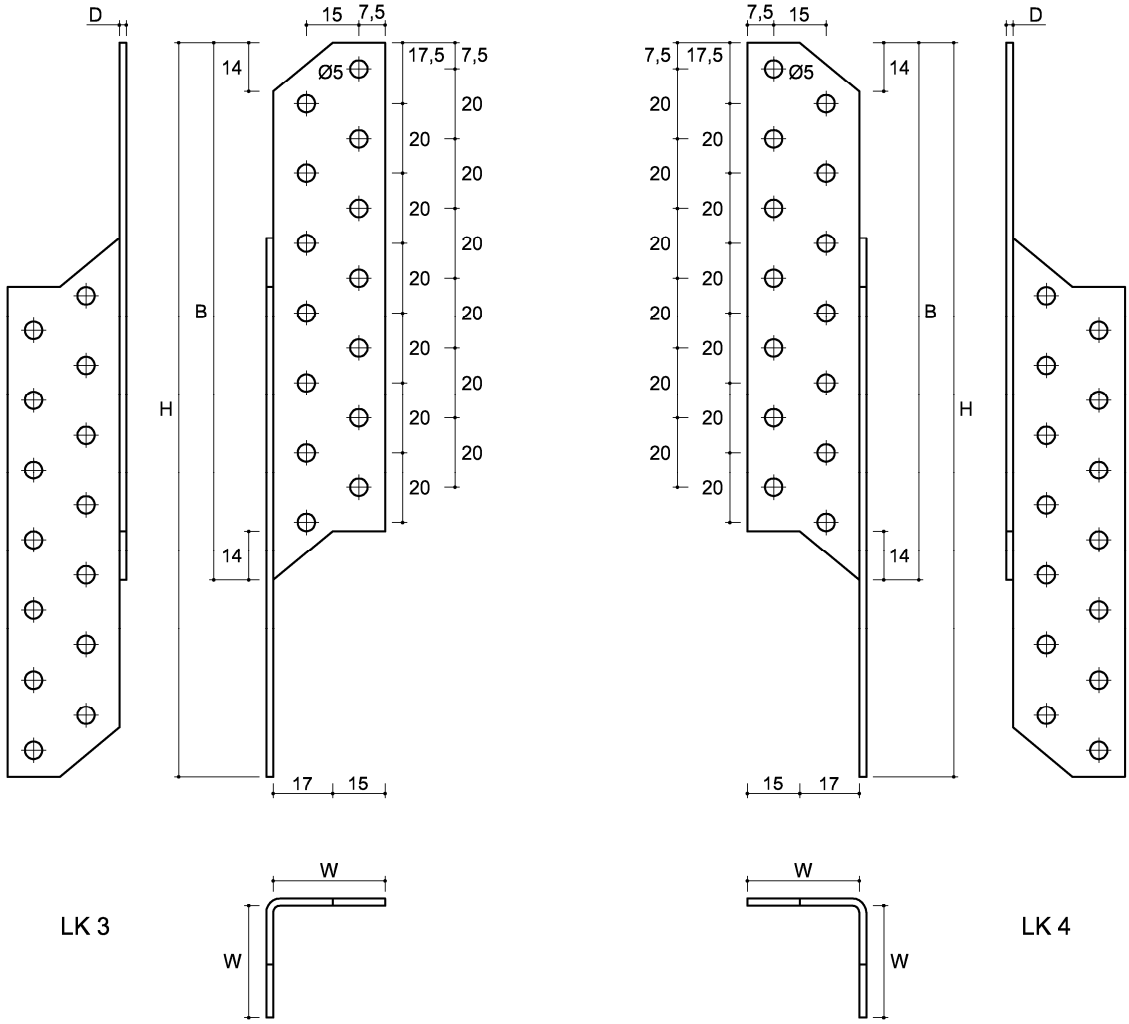


Table 16. DMX® type LK three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes	Type
	W	H	B	D	ϕ5	
LK 3	32	210	154	2	28	left
LK 4	32	210	154	2	28	right

DMX® type KK, KM, KP and LK	**Annex A15** of European Technical Assessment ETA-11/0140
Three-dimensional nailing plates DMX® LK	

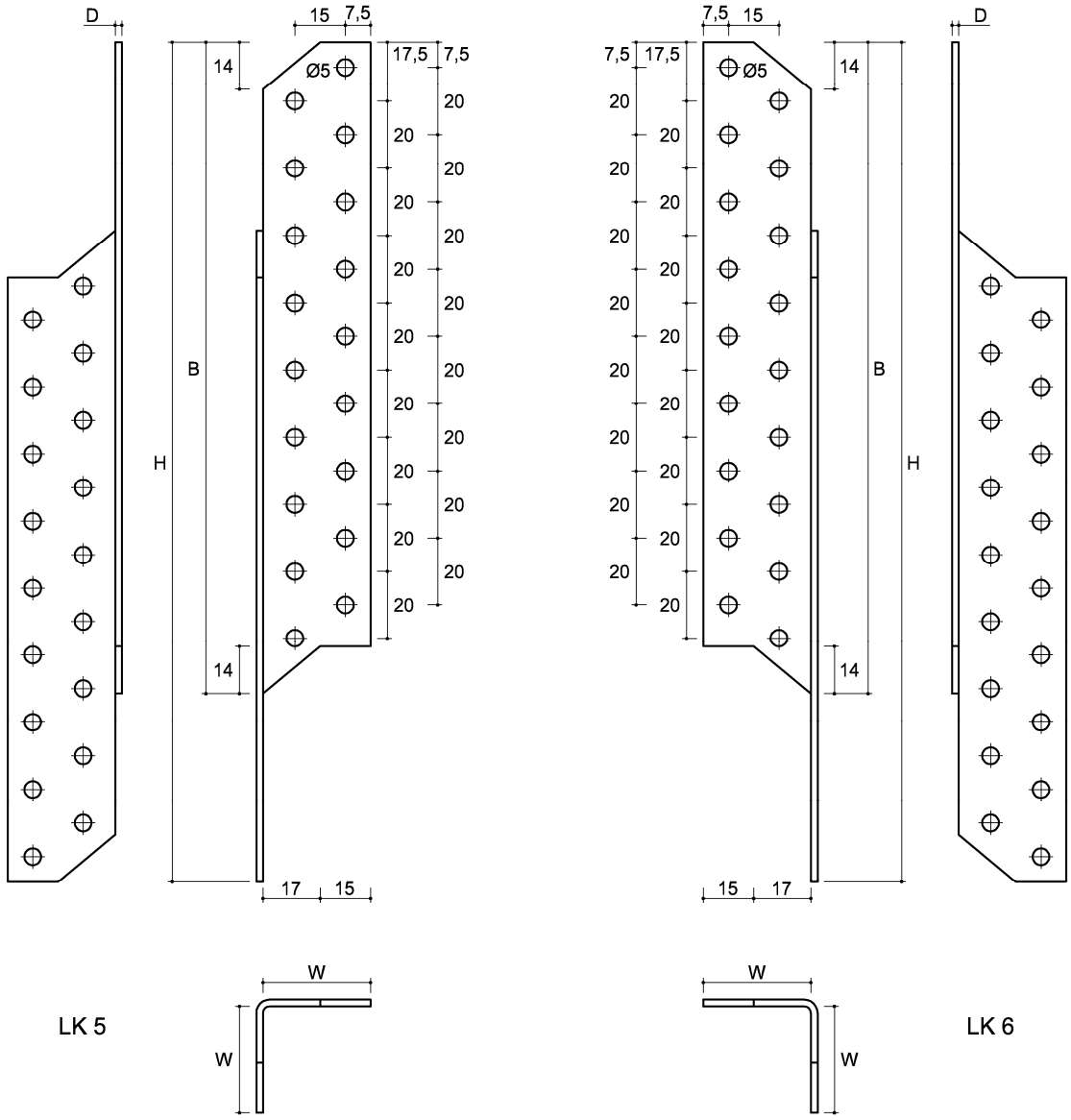


Table 17. DMX® type LK three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes	Type
	W	H	B	D	ϕ5	
LK 5	32	250	194	2	36	left
LK 6	32	250	194	2	36	right

DMX® type KK, KM, KP and LK	**Annex A16** of European Technical Assessment ETA-11/0140
Three-dimensional nailing plates DMX® LK	

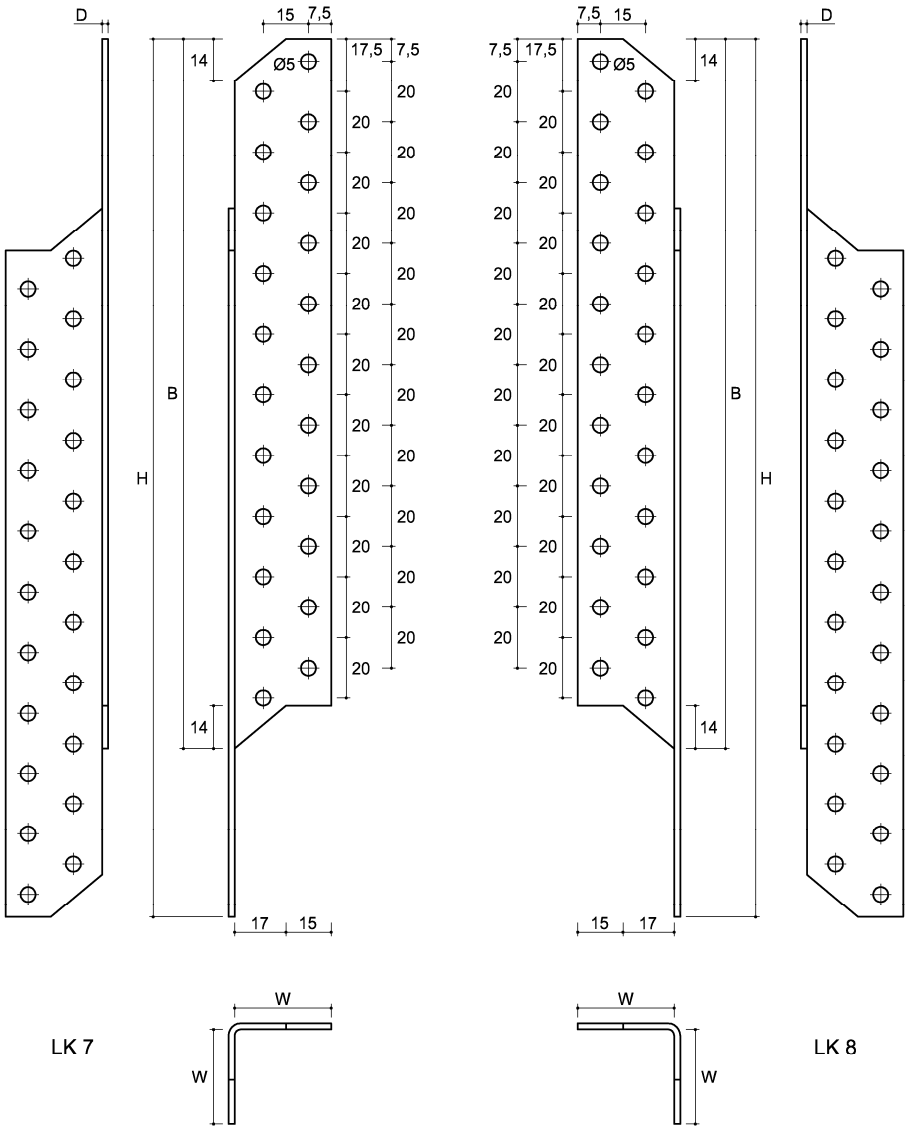


Table 18. DMX® type LK three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes	Type
	W	H	B	D	ϕ5	
LK 7	32	290	234	2	44	left
LK 8	32	290	234	2	44	right

DMX® type KK, KM, KP and LK	**Annex A17** of European Technical Assessment ETA-11/0140
Three-dimensional nailing plates DMX® LK	

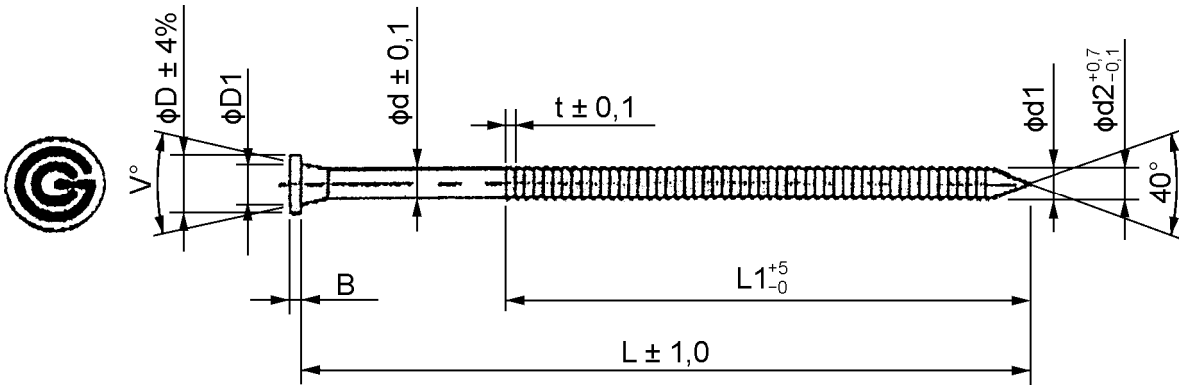


Table 19. ANCHOR (GUNNEBO ANKARSPIK) nail symbols and dimensions

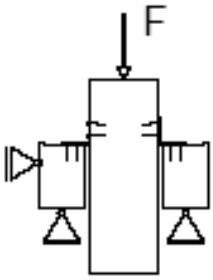
Symbol, L-d	Dimensions, mm										
	L	L1	d	d1	d2	t	D	D1	B	d2-d1*	v°
125-4,0	123,5	70	4,0	3,6	4,4	1,25	8,0	5,6	1,5	0,6-1,0	25°
100-4,0	98,5	70	4,0	3,6	4,4	1,25	8,0	5,6	1,5	0,6-1,0	25°
75-4,0	73,5	65	4,0	3,6	4,4	1,25	8,0	5,6	1,5	0,6-1,0	25°
60-4,0	58,5	50	4,0	3,6	4,4	1,25	8,0	5,6	1,5	0,6-1,0	25°
50-4,0	48,5	40	4,0	3,6	4,4	1,25	8,0	5,6	1,5	0,6-1,0	25°
* Acceptable tolerances of difference in dimensions d2-d1 are (-15% / +25%)											

Nails are made of non-alloy steel rods drawing according to EN 10016, Parts 1 ÷ 4; $R_{m.min} = f_u = 600$ N/mm^2.

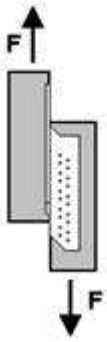
Table 20. Characteristic withdrawal capacity of the nails ANCHOR (GUNNEBO ANKARSPIK) with the overall length of 50 mm

Steel sheet thickness, mm	Nail with the diameter d, mm	Depth of embedment, t_{pen}	Characteristic load-carrying capacity*, $F_{ax, Rk}$, kN
2,00	4,00	8d	1,55
2,50	4,00		
* Timber characteristic density $\rho_k \geq 350$ kg/m^3			

DMX® type KK, KM, KP and LK	**Annex A18**
ANCHOR (GUNNEBO ANKARSPIK) ring shank nails	of European Technical Assessment ETA-11/0140

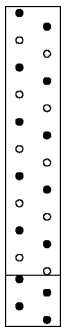


Static diagram No 1



Static diagram No 2

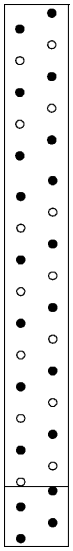
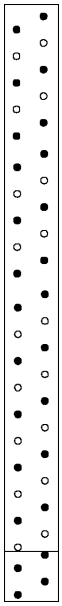
Table 21. Characteristic load-carrying capacity of joints made with DMX® type KK three-dimensional nailing plates

DMX® symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
KK 1		8,90

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 1

cont. Table 21

DMX® symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
KK 2		11,52
KK 3		14,26

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

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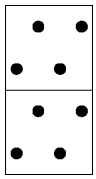
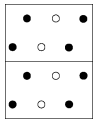
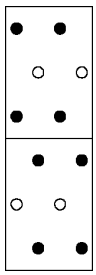
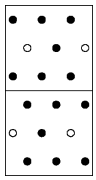
DMX® type KK, KM, KP and LK	**Annex B2**
Characteristic load-carrying capacity of joints made with DMX® type KK three-dimensional nailing plates	of European Technical Assessment ETA-11/0140

Table 22. Characteristic load-carrying capacity of joints made with DMX® type KM three-dimensional nailing plates

DMX® symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
KM 1		3,81
KM 2		3,81
KM 3		3,83
KM 4		5,79

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

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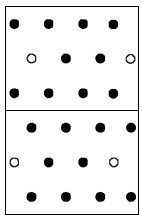
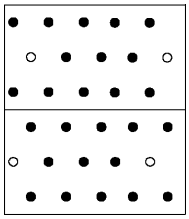
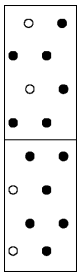
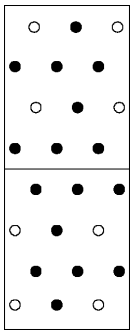
cont. Table 22

DMX® symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
KM 5		6,86
KM 6		7,72
KM 7		5,79
KM 8		6,68

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

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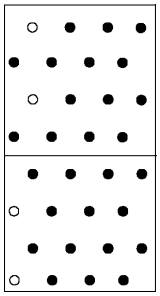
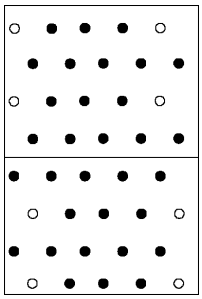
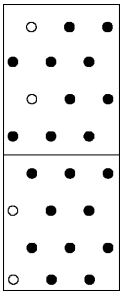
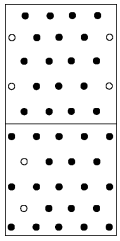
cont. Table 22

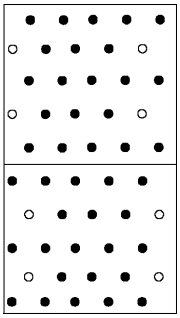
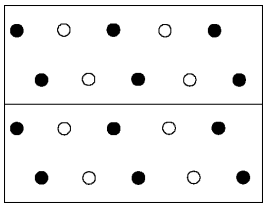
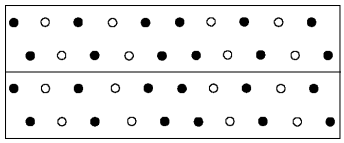
DMX® symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, $R_{k,}$ kN
KM 9		8,64
KM 10		10,91
KM 11		6,99
KM 12		13,01

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 1

DMX® type KK, KM, KP and LK	**Annex B5** of European Technical Assessment ETA-11/0140
Characteristic load-carrying capacity of joints made with DMX® type KM three-dimensional nailing plates	

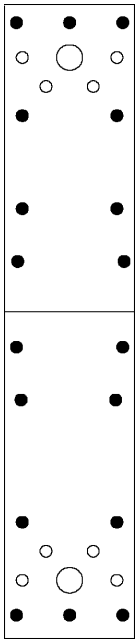
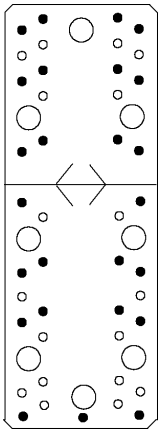
cont. Table 22

DMX® symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, $R_{k,}$ kN
KM 13		13,01
KM 14		5,65
KM 15		7,21

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 1

Table 23. Characteristic load-carrying capacity of joints made with DMX® type KP three-dimensional nailing plates

DMX® symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
KP 5		10,92
KP 6		21,89

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

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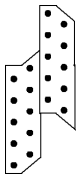
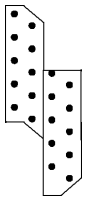
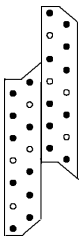
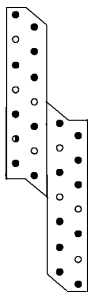
Table 24. Characteristic load-carrying capacity of joints made with DMX® type LK three-dimensional nailing plates

DMX® symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
LK 1		19,36
LK 2		19,36
LK 3		19,25
LK 4		19,25

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

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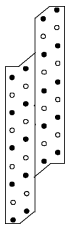
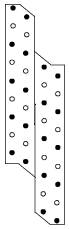
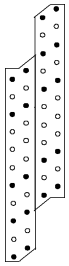
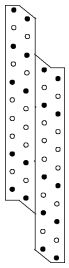
cont. Table 24

DMX® symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, $R_{k,}$ kN
LK 5		19,91
LK 6		19,91
LK 7		19,35
LK 8		19,35

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 2